# THE PLUTO FAST FLYBY MISSION: COMPLETING THE RECONNAISSANCE OF THE SOLAR SYSTEM

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## ABSTRACT

The concept of a fast flyby mission to Pluto has been advanced as a means to complete the reconnaissance of the known solar system. In order to acquire data on the Pluto system at the earliest possible time, and within the professional lifetime of investigators now active in the field, concepts are being developed for relatively small spacecraft in the mass range of 70 Kg to 350 Kg with flight times to Pluto of 7 to 13 years.

Necessarily, the science complement on such a mission will be very mass and power limited. The challenge will be to define a spacecraft and an instrument package that will maximize the scientific return within these limitations.

Cost, of course, will be a major consideration, and funds for new technology development specific to this mission will not be extensive. Consequently, innovative ways to incorporate elegant simplicity into the designs must be found.

In order to facilitate exploration of the Pluto-Charon system, fully integrated science payloads must be developed. Two proposed mission designs involving limited mass and power science payloads have been presented to the Outer Planets Science Working Group (OPSWG). These payload mass allocations range from 5 to 30 kilograms with power allocations as low as 5 watts. The drivers behind these low mass and power allocations are that they enable developing missions to fit within the moderate mission cost profile and allow fast flight times to Pluto (7 to 13 years).

The OPSWG has prioritized science goals for this class of reconnaissance mission. Three specific science objectives were identified as the highest priority required for the first Pluto mission. These goals were: 1) Study of the neutral atmosphere, 2) Geology and morphology, and 3) Surface compositional mapping. In order to achieve these science goals within the constraints of low mass, power and cost, it may be necessary to combine the functions of 3 conventional instruments (CCD camera, Ultra-Violet Spectrometer, and Infrared Spectrometer) into one fully integrated payload. Where possible, this payload would share optics, mechanisms, electronics and packaging.